PC TAP

Consumer Report

dBASE IV Version 1.1

Open Forum
The Scanman™ Scanner

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PC Technology Assessment Program
EPA National Data Processing Division
Information Centers Branch - RIC II, MD-35
Research Triangle Park, NC 27711
Telephone: (919) 541-0568 (FTS) 629-0568

From the Editor's Desk

In this *PC TAP Consumer Report* we examine Version 1.1 of dBASE IV. Much has been said in the trade media about Ashton-Tate's data base stalwart, especially in light of the myriad problems surrounding dBASE IV Version 1.0, so it was considered important that user input about the product be gathered through the PC TAP program.

We were particularly pleased with the obvious effort put into this evaluation by those who participated in the study. Feedback was complete and comprehensive, and comments provided by evaluators reflected considerable thought. In other words, the people who tested dBASE IV Version 1.1 for us took the task seriously, and they took pains with the feedback they provided for inclusion in this report. This is particularly gratifying for us, because it demonstrates that the PC Technology Assessment Program is achieving its primary objective: facilitating the evaluation of desktop computing products *in the workplace* (not in a lab environment) *by users, for users.*

In *Open Forum*, beginning on page 17, there's a brief article about the ScanMan Plus hand-held scanner from Logitech. Some significant improvements have been made in this technology since we published our report on desktop scanning in January 1990, and we wanted to share with you our impressions of this handy (no pun intended) device.

Our next study will highlight desktop publishing in the MS DOS environment. Also in an upcoming *Consumer Report* we will be bringing you up to date on some topics we've featured in past issues, much like the item on the ScanMan Plus hand-held scanner in this issue's *Open Forum*. We'll also report on some interesting items that aren't significant enough to be the subject of a major PC TAP study. This future report will have a more "newsy" flavor, and we hope it will be a pleasant and informative change of pace.

David A. Taylor
PC TAP Coordinator

dBASE IV Version 1.1

Introduction

Those who write data base programs, as well as many users of such software, are familiar with the saga of dBASE IV. As the latest in Ashton-Tate's industry leading dBASE family of products when it entered the marketplace in 1988, Version 1.0 of dBASE IV was less than a success. Since then, other data base products, like Clipper, FoxBase, and Paradox, have made significant inroads into the dBASE market. The release of dBASE IV Version 1.1 last summer marked Ashton-Tate's first step toward re-establishing itself as the dominant producer of data base management software.

With EPA's significant investment in the Ashton-Tate dBASE software line, and with consideration for the lackluster market performance of dBASE IV Version 1.0, the question of Version 1.1's viability has significant implications for the Agency. Hence, PC TAP was asked to conduct a user-oriented evaluation of the product. Before delving into the particulars of dBASE IV, however, we'll discuss some of the fundamentals of data base management for the benefit of readers who aren't familiar with the subject.

The Data Base Management System (DBMS)

The field of microcomputer data base management systems comprises a wide and diverse group of products. A DBMS is software that serves as a user interface with a *data base,* which is a collection of related files. Low-end products, often called "flat file managers," perform minimal data management functions like data input, selective retrieval, sorting, and report generation, on individual files. Flat file managers are appropriate for applications requiring processing power for a limited number of relatively simple capabilities. They usually are easy to learn and use.

At the other end of the spectrum is the relational data base management system. Relational systems are more sophisticated and complex than simple flat file managers, and they offer much more processing power. The term *relational* reflects the DBMS' capability to relate separate files through tables of common fields called *keys.* For example, suppose a mail order business has customer information in one file, order information in another, and inventory in a third file. If the customer file and the order file both contain a "customer number," the files could be *related,* or linked, through that common field. Similarly, the order file might be linked to the inventory file by the stock number of the item being ordered. Through this scheme, the three files constitute a relational data base that can be thought of as a single entity. In this example, a single transaction could process a new order, debit the customer's account, and update the inventory file to reflect a decrease in the number on hand of the items contained in the order.

Major Features of the DBMS

Relational data base management systems provide sophisticated functionality far exceeding that of the flat file managers. They provide for multiple file manipulations whereby data in one file can be used to select, update, or delete data in another file. They have the capability to protect data from unauthorized access or contamination, while also providing the means to import and export data from other software products, including word processors and spreadsheets. Relational DBMSs can process varied data types and very large files—for practical purposes the data base size is limited only by the amount of disk storage space available. To make the DBMS' processing power available to the user, it must also have an efficient, user-friendly interface that supports form generation for data entry and viewing, adequate report generation capabilities, and programming language support. It is also important that multiuser capabilities are incorporated into the product. Such a capability ensures that the operations of one user do not interfere with or contaminate those of another user when the product is installed in a network environment.

Data Base Queries

The fundamental purpose of a data base management system isn't to create data bases (although they can do that); it is to provide people with quick, easy, selective access to the data contained in the files the DBMS comprises. A lot has to go on behind the scenes in order for that to happen. In the jargon of data base management, the means to gaining this access is the *query*.

A DBMS query is a set of instructions the system uses to locate the various bits of data the user wants, and to present those data to the user in the prescribed format. A query specifies the criteria to be used when accessing the data base. An example of a simple query would be selecting from a name-and-address file all the records in which the zip code is 20460. Queries can be used simply to examine data (a *view query* in dBASE IV) or to change selected records (an *update query* in dBASE IV). A *query language* is a set of English-like instructions that enables end users to construct queries without having to actually write programs.

A common, powerful technique for building queries is called *query by example,* or QBE. The situation described above, where all the records containing a specific zip code are accessed, is an example of QBE. The DBMS provides a means, often a "fill-in-the-blanks" screen, for the user to specify the criteria (detailing the "example" upon which the query is to be based). Then the software's QBE function actually formulates and executes the data base search to locate the records that meet the user-supplied criteria.

Another query language that receives a lot of attention is the Structured Query Language, or SQL (pronounced *sequel* by some of the DBMS-savvy). SQL was developed by IBM, and to some extent has become a de facto database language standard in the minicomputer and mainframe environments. SQL is relatively new to the microcomputer arena, but is becoming increasingly important with the proliferation of LANs. This is because SQL can accept a query from a "front-end" (like dBASE IV), process the request, receive the results from the "back-end" (for example, a DB2 data base), and return the data to the requestor. The user doesn't have to be concerned with the intricacies of the process; SQL ensures the handshake between the front-end and the back-end.

The Client/Server Approach

SQL is a key component in the trend toward client/server architecture (CSA) for LAN-based DBMSs. CSA divides database functions into components: a microcomputer (the *client*) that serves as the user's workstation; and a data base engine (the *server*) that receives user requests, selects data that meet the criteria specified in the query, and returns the selected records to the user. The beauty of CSA is that the various components don't have to be able to talk to one another, so long as they can all "speak SQL." The potential of this strategy for cross-platform retrievals is significant. This can be illustrated with an example of how a fully-implemented SQL network could function. On a LAN with an SQL server, LAN users of dBASE IV (which speaks SQL) could access data in a DB2 data base (which also speaks SQL) on a mainframe computer. The criteria for the query would be specified in dBASE IV by the end user. The SQL server would then formulate the query, submit it to DB2 on the mainframe; and relay the results back to the dBASE IV user on the LAN.

As we have already pointed out, full implementation of client/server SQL is a goal toward which DBMS vendors are working. And although it is by no means a standard yet, a number of industry spokespersons are lobbying for its adoption as such. Moreover, while dBASE IV Version 1.1 can execute the full SQL command set, it presently lacks CSA functionality. Ashton-Tate currently is developing a server edition of dBASE IV, for which most projections target a summer '91 release.

Focusing on dBASE

Now that we've reviewed some database fundamentals, we will take a closer look at the subject of this report, dBASE IV. Let's also establish that hereafter in this report, when we refer to dBASE or dBASE IV, we always mean dBASE IV Version 1.1 unless another particular release or product is specified.

While dBASE III Plus enjoyed great success in the marketplace and was widely accepted by database programmers, dBASE IV Version 1.0 was released late, plagued with bugs, and demeaned by the industry press (albeit, perhaps, with good cause). Ashton-Tate's primary objective for Version 1.1 has been to demonstrate that they can still produce a solid product that delivers on its promises. The trade reviews indicate that this goal has been accomplished. Thus, advocates of dBASE IV can point to the product with pride and say Ashton-Tate has exonerated itself with a state-of-the-art product. dBASE IV detractors, on the other hand, may say "all they've done is deliver on what they promised two years ago." The truth probably lies somewhere between these two extreme positions.

What Ashton-Tate Says

Over the past couple of years several products, including *Oracle* and Lotus' *DataLens*, have been featured in special supplements of *DBMS* magazine. A comprehensive treatment of dBASE was presented by Ashton-Tate in such a supplement to the October 1990 issue. In the supplement, along with an overview of the features and capabilities of dBASE IV Version 1.1, Ashton-Tate discusses their strategy for ongoing development of the dBASE family of software products.

Among the improvements in dBASE IV Version 1.1, Ashton-Tate points particularly to better performance resulting from lower memory requirements (450K available at run time), a built-in memory manager, and a disk caching option. Other enhancements of note include easier setup and a user-friendly configuration change capability; expanded use of User Defined Functions; better Query By Example design screen; improved Structured Query Language function; and expanded printer support to include PostScript and HP LaserJets.

Ashton-Tate says dBASE is evolving with a class of user in mind: the *user/developer*. This individual is distinguished from the *end user* by his or her more advanced data processing skills. The user/developer is defined by Ashton-Tate as "frequently a person in a state of transition from a primary discipline to a deeper involvement in application development. . . . The user/developer has begun to think in a systematic manner. dBASE IV no longer appears so much as a set of doors to separate databases, but as a set of integrated data management tools." As the Control Center was developed to extend more flexibility and power to end users, the Application Generator is seen as a means for empowering the user/developer.

The ongoing evolution of the dBASE family of products is a key element in the Ashton-Tate report. Two key products currently are said to be getting a lot of attention by the company's developers: the dBASE IV Server Edition, and a group of products called dBASE DIRECT. The server edition will be the client front end for a database server system that will support popular back ends, including Microsoft SQL Server, DEC RDB, OS/2 Extended Edition Database Manager, and others. The product is being designed to run on a 286 or 386 microprocessor with 2MB of available RAM. The server edition will be compatible with IBM's DB2 mainframe product, and its interface will be identical to that on the standard PC edition of dBASE IV.

The dBASE DIRECT line of products uses industry standard application interfaces to allow PC users to upload and download from databases on IBM minicomputers and mainframes. The Ashton-Tate strategy also calls for versions of dBASE that will be compatible across multiple platforms. Versions are available or planned for OS/2, UNIX, VAX, and Macintosh systems.

Last, but not least, Ashton-Tate is committed to providing a true native-code compiler for the dBASE language. This product, to be named the *dBASE Professional Compiler,* is probably awaited by dBASE programmers with more anticipation than any of Ashton-Tate's in-development products. Although no specific release date for the compiler has been announced, a "summer '91" availability is generally expected by industry watchdogs.

Concluding the DBMS supplement with a statement of his company's aspirations, William P. Lyons, President and CEO of Ashton-Tate, said ". . . we are committed to working closely with our customers to develop and deliver a series of regular releases that address the changing needs of the dBASE community. You'll also see new products that enhance the applications development process, as well as other products that will provide exciting new opportunities to build and run dBASE applications on a wide range of hardware and operating system platforms. . . . Our goal is to be more responsive . . ."

What the Press Says

Reviews of dBASE in trade publications are invariably favorable, although some suggest that if you're shopping for a DBMS other database products should be considered seriously. Nevertheless, everyone seems to agree that dBASE is vastly improved, and that the bugs that contributed to the notoriety of version 1.0 are gone. Readers of *Data Based Advisor* voted dBASE IV "most improved product" for 1990. In that same poll, dBASE shared the "best documentation" award with Borland's Paradox. Here are some quotations from other reviews:

> Finally, a solid, usable version of dBASE IV is out . . . The program performed between 30 percent and 100 percent better than [version] 1.0 in terms of application speed and data manipulation.—"Ashton-Tate's dBASE IV 1.1 Makes the Grade," *PC Week,* August 6, 1990, pp. 1,6.
>
> Our evaluation shows that Ashton-Tate appears to have kept its promise to deliver a stable, working version of the product . . . With all the improvements, we now rate Dbase IV a good value.—"Dbase IV Bounces Back With The Arrival of Version 1.1," *InfoWorld,* August 20, 1990, pp. 78-81.
>
> Dbase IV 1.1 is a safe product—and as our review shows, a stable one. But it's not an exciting product. It doesn't break new ground.—"Dbase IV 1.1 is a Stable But Unexciting Product," *InfoWorld,* August 20, 1990, p. 74.
>
> dBASE IV Version 1.1 is here—finally. It works—really. It fits into a standard DOS configuration—reasonably. It's a solid database product with many good features.—"dBASE IV 1.1: A Promise Kept?" *PC Computing,* January 1991, p. 110.
>
> . . . *dBASE IV,* Version 1.1, is a far more useful product than *dBASE III Plus,* and a stable, reliable replacement for Version 1.0.—"dBASE IV, Version 1.1, A New Beginning," *PC Magazine,* January 1991, p. 155.
>
> With release 1.1 of dBASE, I feel confident that I could provide a powerful application that works reliably . . . in real time. dBASE IV has come a long way since its first release.—Steven Holzinger, "With 1.1, dBASE IV is back in the running," *Systems Integration,* August, 1990, p. 23.

In media reports that cite performance test data, dBASE rarely scores rave reviews, but it makes a respectable showing. In fact, as is often the case with software comparisons, each one in a group of similar products has specific areas in which it excels and others in which it lags behind its competitors. This phenomenon was pointed out in a *PC Week* review (December 10, 1990 issue, pp. 87-94) of networked DBMSs, which declared "no clear winner among DBMS heavyweights" in a comparison of dBASE, R:base, and Paradox. Another nationally-recognized software testing lab rated dBASE best among the leading multiuser database programs. Overall, dBASE makes a good showing, and some analysts

express the opinion that Ashton-Tate is well along the road to recovery as the microcomputer industry's DBMS frontrunner with Version 1.1.

In Summary . . .

We've presented a synopsis of Ashton-Tate's vision for the 90's, and we have reviewed some of the reports on dBASE IV from industry publications. When the various pieces are put together, a picture emerges of a company that is trying to put the past behind it and re-establish itself as the microcomputer DBMS market leader. Reviews suggest that the software itself is stable, reliable, and competitive, if not overwhelming. User acceptance generally appears to be favorable. But does this picture carry over to the EPA environment? The opinions of participants in our PC TAP study, which provide some insight into that question, follow.

The PC TAP Study

The methodology used in this study is familiar to regular readers of *PC TAP Consumer Reports.* Quite simply, we put dBASE IV Version 1.1 in the hands of a group of users and asked for their opinions of the product. As has been the case with PC TAP studies of several other products, the vendor—in this case Ashton-Tate—was generous in providing copies of the software for our evaluators' use.

To assist evaluators in providing feedback in a common format so we could compile it and incorporate the results into this report, we distributed a questionnaire to all participants. The questionnaire focused on the advertised major features and enhancements of dBASE IV Version 1.1, and also addressed the *primary* questions we wanted to answer:

1. Does dBASE IV Version 1.1 represent a significant improvement over Version 1.0?

2. If the answer to #1 is "yes," is Version 1.1 a worthwhile upgrade from dBASE III Plus, and should we recommend that users upgrade from dBASE III Plus to dBASE IV Version 1.1?

3. How much trouble for users is the upgrade from dBASE III Plus to dBASE IV 1.1?

4. Is dBASE IV Version 1.1 a viable LAN product, one that you would be willing to have *instead of dBASE III?* (You can't have both on the same server volume.)

5. Should EPA consider supplementing the Ashton-Tate dBASE product line with other data base software, or should we seek alternative data base products?

The Participants

Compared with PC TAP studies of other software, finding dBASE IV evaluators was more difficult. When an appeal to the PC TAP External Resource Network failed to generate sufficient response, a followup request to help identify participants was sent to regional ADP chiefs. Ultimately, ten people provided feedback for this report, nine of whom completed evaluation questionnaires. It should be pointed out that those who participated are not *end users;* Information Center consultants and other "techie" types comprise the group. We conclude that true end users don't consider themselves up to the task of evaluating a package as complex as dBASE (no doubt with good reason). However, several evaluators commented from the end user's perspective on several features, and we did have input from one person at PC TAP who had not previously used dBASE or any other DBMS.

All nine people who completed evaluation questionnaires said they had used previous versions of the Ashton-Tate family of database products. When asked to quantify his or her level of dBASE expertise, one said "novice," four said "journeyman," and three responded "expert." Six of them said they had experience with database software from other vendors. Among the products mentioned were Informix, Alpha4, FOCUS (both PC and mainframe versions), pfs:File, Oracle, RBASE 5000, Foxbase, Smartfile, MS Works, and Proffile. The reported levels of expertise for these products matched those reported for dBASE.

There was quite a bit of variation among the computer configurations on which our respondents tested dBASE. The 286, 386sx, 386, and 486 microprocessors all were represented. Available memory ranged from 640K to 10MB, and amounts of free disk space as low as 1MB and as high as 30MB or more were reported. We didn't note any machine-dependent trends in the evaluation data.

In the discussion that follows, we will summarize the evaluators' input with respect to each major topic addressed by the questionnaire. Elaboration and clarification based on our own research, testing, and experience also will be provided.

Questionnaire Responses

To help us collate evaluator feedback, participants were asked to use a common rating scale to rank various aspects of dBASE. Here's the way the scale was presented on the questionnaire:

> In the items that follow, please use the indicated 1-to-5 evaluation scale to rate various aspects of dBASE IV. For items that don't apply or with which you have no experience, enter a rating of zero.
>
> Most Difficult or Least Satisfactory ... Least Difficult or Most Satisfactory
>
> 1 2 3 4 5
>
> |----------|

In the discussion that follows of responses to specific questionnaire items, the average score for all respondents will be indicated. Responses of zero, indicating a particular evaluator did not test a given item, were not included when the averages were calculated; that is, the divisor in the averaging equation was reduced by the number of zero responses for the item.

Installation/Documentation

The first item on the questionnaire addressed ease of installation and the quality/usefulness of the documentation. Everyone seemed to agree that installation is simple and straightforward. One person remarked that he would have liked more information about the caching option. We also felt that need, and we're betting most "end users" would scratch their heads during the portion of the installation process where they have to decide whether or not to install caching, and whether to choose *extended* or *expanded* memory in conjunction with the cache. With this one exception, we thought the installation of dBASE was a snap.

There was some significant disagreement about the documentation. One person commented that the product will be acceptable only when better documentation is available, while another said the documentation was really great. Other opinions range between these two extremes. Certainly there is a lot of documentation with dBASE: if you include the technical notes, there are eight separate books. Each volume deals with a different aspect of the product, or with increasingly more complex or in-depth treatment of its use. Some people consider this a good approach, because you can go to the book that deals with

the subject in which you're interested and find a fairly detailed discussion without wading through a lot of material about other topics. Furthermore, the individual booklets are small and easy to handle, while a single volume large enough to hold all that information would be unwieldy. On the other hand, some people didn't like dealing with so many different pieces of documentation; one person said the book you need is always the one you can't find at the moment.

We at PC TAP felt the documentation was generally well written and understandable on the surface, but we had trouble understanding the specific discussions in a couple of areas. Two people specifically reported giving up on the documentation entirely while trying to configure reports. Recall, however, that dBASE did tie for the "best documentation" award in *Data Based Advisor's* user poll.

The overall averages for installation and documentation were 4.5 and 3.5, respectively.

The Control Center

Next, the evaluation questionnaire addressed dBASE's Control Center, the full-screen menu-driven alternative to the dot prompt. The Control Center replaced the Assist function that was available in dBASE III. The Control Center is the "home base" from which all the functions a user typically would want to perform can be initiated. Here is the Control Center screen layout.

```
Catalog   Tools   Exit                                          10:48:38 am
                          dBASE IV CONTROL CENTER

                    CATALOG: D:\DBASE\SAMPLES\SAMPLES.CAT

   Data        Queries      Forms       Reports      Labels      Applications
 <create>    <create>     <create>    <create>     <create>     <create>
 TEST1

File:         New file
Description: Press ENTER on <create> to create a new file

 Help:F1  Use:<—┘  Data:F2  Design:Shift-F2  Quick Report:Shift-F9  Menus:F10
```

Our evaluators' opinions of the Control Center appeared to be directly related to their level of sophistication in the use of dBASE. The more familiar one is with the product, and the further one has progressed in the transition from *end user* to *user/developer* or *programmer,* the less likely it is that he or she will want to spend much time in the Control Center. In short, programmers and power users like the dot prompt; end users like the Control Center.

Really, there's nothing wrong with this situation; it's obviously what Ashton-Tate had in mind with dBASE IV. Our dBASE novice found it easy to become productive in dBASE very quickly with the Control Center; that is, to gain enough expertise to create and modify database files, build and execute simple queries, and generate quick reports. Here are some quotations from comments on the questionnaires:

> The addition of the control center . . . will alleviate many of the simple programming requests . . . users will now be able to do many things on their own. I found I could do about 95% of what I needed done through the CC.
>
> The Control Center is an easy and efficient way to work.
>
> I have helped users with Assist, and I hate it. The Control Center appears to be a vast improvement.

To approach the question from another perspective, we asked people to indicate their preference among dBASE III Plus' Assist, dBASE IV's Control Center, and the dot prompt. Sixty percent said they prefer the dot prompt, 40 percent prefer the Control Center, and none chose Assist.

We asked participants to rate each of the Control Center functions—Data, Queries, Forms, Reports, Labels, and Applications—and also to indicate an overall rating for the Control Center. For each of the functions there were more 4's than any other single score, but there were enough scattered 1's, 2's, and 3's to bring the overall average down a bit to 3.0.

Typical dBASE Functions

Next we asked our evaluators to perform normal database functions against existing dBASE files that were created with earlier versions of dBASE or with other compatible products. Specifically, we asked them to browse and edit database files, create forms, print labels, design and print reports, and execute QBE and SQL queries. Although not everyone tried every one of these functions, all the functions were exercised by at least one evaluator—and usually by several.

Most people tried Browse and Edit, and those functions got high scores—a 4 average for each. Forms and Reports came in next, both with 3 averages. The average for Labels was 2.5, and SQL got the lowest average, a 2. (There's more about SQL on page 11.) In the space we provided for participants to write in other functions they tested, one person wrote in "Compiler," with a score of 3.

We wondered how programs written in earlier versions of dBASE and incorporating calls to other languages, like Assembler or C, would run. However, none of our evaluators reported testing programs with such calls. Five people tested programs that included "SET PROCEDURE TO <filename>" and/or "DO <filename>" statements. The only reported program revisions involved syntax errors, the need to declare variables, and some difficulty interpreting error messages pointing out these problems.

We also asked about the size of test data bases, the number of records and fields they contained, the number of transactions processed, and whether any linked files were included in users' tests. There was wide variation in the responses to these items. Data base size ranged from a few thousand bytes containing only test records to 1.5 megabytes containing more than 29,000 records. Although most did not incorporate file linkages, one person had three linked files and thousands of transactions. In all cases, no significant problems were reported running any tests. This questionnaire item summarizes the "conversion" aspect of moving up to dBASE IV Version 1.1:

. . . to what extent do you agree that "conversion" of dBASE III Plus files and/or programs is NOT a significant problem?

Strongly Disagree — Strongly Agree

1 2 3 4 5

|----------|----------|

Comments were made about "irritating" syntactical errors that had to be corrected, but that's to be expected with dBASE IV's "stricter" syntax checker. One person commented that when executing a program that ran fine under dBASE IV Version 1.0, a screen-formatting program generated an "Illegal Value" error. The documentation was said to be "useless" in trying to troubleshoot the problem.

Among the enhancements in Version 1.1, those in the areas of User Defined Functions (UDFs) and Windowing were touted as among the most significant. We asked people to report on those functions, along with any other items about which they cared to comment from the enhancements listed in the documentation. The average score for Windowing was 4.0; UDFs received a score of 3.5. Comments related to other enhancements included these:

Enhancement	Comment
Windowing	Useful
Number of Open Files	Very Helpful
Number of Procedures	Very Helpful
Linking	Wonderful
.MDX (Index) Files	Fantastic
TAG Files	Great way to change master index
Calculations	Great—no longer have to exit to 1-2-3

Considering the emphasis most people put on speed, we asked evaluators about their satisfaction with the operating speed of dBASE on their machines. The responses to this item reconfirmed that speed is a highly subjective judgment, and answers to "is it fast enough" questions are not reliable enough to be used for serious decision-making purposes. In other words, the way one responds to "is it fast enough" depends on what you're used to, and what your perception of "fast enough" is.

Speed Rating on 1-to-5 Scale	Microprocessor in Rater's System
5	25MHz 486
5	20MHz 386
4	16MHz 386
4	16MHz 386
4	12MHz 286
4	12MHz 286
3	16MHz 386sx
3	12MHz 286
2	16MHz 386

It's not surprising that the person with the 486 machine rated dBASE's speed 5 ("blazing"). But evaluators with 386 or 386sx machines gave speed scores of 2, 3, 4, and 5—covering a rough range of "really slow" to "super fast," while 286 users registered 3's and 4's (analogous to "satisfactory" and "crisp"). If beauty is in the eye of the beholder, then speed is relative to the internal clock of the perceiver. You really can't take someone else's word for it; you just have to speed for yourself.

The SQL Issue

Although only one of our questionnaire respondents reported having tested the SQL function, there was considerable interest in this aspect of dBASE within NDPD. Local testing at RTP did not yield high marks for the current dBASE IV SQL capability. While the user of standalone dBASE IV may never even explore the product's SQL command capabilities, the implications of SQL in the LAN client/server environment are highly significant, as we pointed out earlier in this report (see page 3).

Our evaluator found dBASE IV's implementation of SQL totally unsatisfactory. The interface between SQL and the rest of dBASE IV was said to be "clumsy." As a result,

> . . . you must be constantly conscious whether anything you do in dBASE IV will mess up your use of SQL with that database. I am reasonably worried that I will damage the data if I do something in dBASE IV or SQL that the other doesn't like . . . The error messages are even worse than dBASE IV [version 1.0] . . . it doesn't even say 'no such fieldname' when you have made a typo in a fieldname—and since you must always type in every single fieldname (no pull down menus, no looking at the field names while creating commands), you will make mistakes . . . Just to make life additionally confusing I notice that some commands that will work interactively fail when put in a command file.

During SQL tests, this evaluator's data base was damaged several times, and reloads from backups were required. And even though 4MB of expanded memory were available on the test machine, an out-of-memory condition was encountered several times. One group of test queries executed fine when working with a single file; but when a related file was added to the query, performance slowed "by a factor of ten" and the procedure failed for lack of disk space although 15MB was free.

dBASE IV's SQL was summarized by our evaluator like this: "I have used other versions of SQL that were MUCH, MUCH easier to use—pull-down menus to get the database and fieldnames right, pull-down menus for functions, and automatic creation of most of the SQL queries. This is a truly UGLY implementation of SQL."

The good news for EPA is that dBASE IV's SQL isn't the only available alternative. Other client/server products can serve as a front-end to dBASE IV and to other data base products. And as we pointed out earlier, Ashton-Tate's dBASE IV server edition, which will be a full implementation of SQL, is expected to be released within the next few months. The success of that product, and the timeliness of its release, will ultimately have a lot to do with dBASE IV's acceptance as a viable LAN product. At present, that viability is being questioned seriously by NDPD's LAN Systems group.

Overall Product Assessment

A primary objective of the PC TAP evaluation of dBASE IV was to determine whether the product does in fact meet the needs of EPA users, and help determine whether NDPD should consider looking for other database software to augment, or even replace, dBASE IV. In that context, we asked evaluators three questions. Those questions follow, along with a tabulation of respondents' answers.

Question: It has been suggested that it might be worthwhile for EPA to consider supporting two standard data base products: a simple, user-friendly one for the vast majority of end users, and a more complex and powerful product for programmers and power users. To what extent do you agree with this proposal?

Response: On the 1-to-5 scale, with 5 meaning "strongly agree," the average score for all respondents was 4.5

Question: If the idea of supporting two data base products were seriously considered, where do you see the role of dBASE IV?

Response: Three people checked "dBASE IV should be the high-end, programmer product."
2 people checked "dBASE IV should be the low-end, end-user product."
3 people checked "dBASE IV can satisfy the needs of both groups."
1 person said "New products should be found to replace dBASE IV for both groups." This person suggested FoxBase Professional.

Question: Based on your current evaluation of dBASE IV, what would you recommend if EPA decides to stay with only one data base product for all levels of users?

Response: Seven people checked "dBASE IV can satisfy the needs of all users."
Two people said "A new data base product should be considered to replace the dBASE family as the EPA Standard." They suggested FoxBase and MS Works.

Question: If the choice were entirely yours, would you upgrade to dBASE IV Version 1.1, or would you stay with your current data base management product?

Response: Six people said they would upgrade. The other three would prefer to stay with Alpha4, dBASE III Plus, and Clipper, respectively.

Finally, respondents were asked to indicate an overall assessment of dBASE IV. Six people rated it a 4, two 3, and one 2, for an overall average of 3.5.

	Poor Product				Outstanding Product
	1	2	3	4	5
Overall Rating for dBASE IV Version 1.1	|----------	----------	----------	----------t	----------|

Evaluators' Comments

Some interesting points of view were expressed in the general comments provided by evaluators at the end of the questionnaire. Here some quotations from those free-form comments.

. . . the report generator is very user friendly—perfect for non-programmers! . . . I do like the Quick Report feature of dBASE IV.

The major option that I tested after upgrading a dBASE III+ system was the "Report Form." It was terribly confusing . . . The upgrade of the system from III+ to IV was easy . . . compiling it was very convenient.

There are undoubtedly many capabilities of dBASE IV, but the time to learn them and the nature of the nested levels makes it hard to keep track of . . . Overall I liked it, particularly for the reports and labels improvements.

. . . I feel that this product has made both great strides forward and significant strides backward. In the Control Center mode I find it confusing, clumsy, and slow . . . On the other hand . . . it appears that dBASE IV will solve at least some of those [LAN] problems. While I feel that dBASE IV is not a GREAT product, for most purposes it should at least be satisfactory.

At the last meeting of the HQ dBASE Users Group, the topic of discussion was the dBASE IV software . . . The response overall was quite positive towards the software . . . users . . . agreed that they would not want to go back to using 'III' because of the new power, functions and improvements. We also agreed dBASE IV is a lot more intense than 'III' and requires the user to put more into getting the proper results.

I found dBASE IV a wonderful upgrade from dBASE III+ . . . The addition of the Control Center versus the Assist I believe will alleviate many of the simple programming requests I receive . . . As a developer I was very glad to see automatic multi user functions included in the application generator!! I can't wait for the compiler.

I expected to be able to do more with dBASE IV than I actually accomplished. My experience with other products did not translate into the significant advantage that I expected. I feel that I am more productive in fully implementing a low end product . . . than in selectively implementing a high end product like dBASE IV. In discussing participation with other staff . . . those who were the most PC literate were converting BBS, public domain, low end accounting packages and even word processor software to their DBMS needs.

A comment on the report writer. I absolutely can not get it to print the correct number of lines per page. When I print from within the create report screen it prints fine. When I execute the same report from the dot prompt it prints five lines on a second page and then begins a new page (with headers) on the third.

Summary and Conclusions

On page 6, at the beginning of our discussion of this PC TAP study, six fundamental questions were listed at which the study was said to be aimed. To conclude our report, we would like to refer again to those questions and to the answers suggested by the study data.

Is dBASE IV Version 1.1 a Significant Improvement?

There is little doubt that the answer to this question is an unqualified *yes.* Reports published in a number of industry publications assert again and again that the widely-reported problems in Version 1.0 have been corrected in Version 1.1, and that dBASE IV is solid, reliable product. Our test data support this finding. Although some evaluators are less enthusiastic than others in their endorsements, even the most reluctant concurred that as a standalone DBMS, dBASE IV now is at least "acceptable." Whether this assessment carries over into the LAN environment still is open to question.

Should Users Upgrade?

By a two-to-one margin, participants in our evaluation said *yes,* again echoing media reports. Reasons given for recommending the upgrade include more processing power, greater flexibility, the convenience and user friendliness of the Control Center, and the utility of the Application Generator. Although there was some acknowledgement that end users will have to make an effort to learn additional complexities of the user interface, most feel such an effort will yield significant rewards.

Obviously, those against upgrading disagree. Interestingly, however, only one of those opposed to upgrading listed dBASE III Plus as their DBMS of choice; the other two respondents who would not move to dBASE currently use data base software from vendors other than Ashton-Tate.

How Much Trouble Is the Upgrade?

While there were some grumbles about an "irritating" need to correct syntactical errors and perform other relatively minor cleanup in existing programs, respondents were moderately strong in their agreement that upgrading from dBASE III Plus to dBASE IV Version 1.1 is not problematic. A real upgrade problem, on the other hand, would be an inability to execute existing programs under the later release of a product.

Among the "problems" some evaluators reported were items we don't consider specific to *upgrading* from dBASE III Plus. These include the necessity to learn to navigate around the Control Center, and having to familiarizing oneself with the intricacies of dBASE IV's enhancements. Although these issues certainly impact the user who chooses to upgrade, one usually expects to have to learn some new functionality and to adjust to new ways of doing things when significant software upgrades are implemented.

Is dBASE IV a Viable LAN Product?

The answer to this question is still open to some debate. We've already noted the dissatisfaction expressed after an internal evaluation of the dBASE SQL capability. However, several industry publications have included recent articles in which dBASE has received acceptable, if not glowing, ratings in the LAN environment. In its December 10, 1990 edition, *PC Week* published results of tests of networked versions of dBASE IV 1.1, Paradox 3.5, and R:base 3.1 in a networked environment. Strengths and weaknesses of all three products were pointed out, and it was concluded that "None of the three reviewed products was found by PC Week Labs to be markedly superior to the others." The report went on to say that "all are capable of producing high-quality end-user applications for use on networks. The final choice will depend on the developer's preference." Another prominent software testing group ranked dBASE IV first among seven top-rated multi-user (that is LAN-based) DBMSs. In the January 29, 1991 issue of *PC Magazine,* it was noted that dBASE IV's SQL implementation had been "considerably improved," but still "cumbersome."

Based on the limited data gathered during our PC TAP evaluation, the answer to our question appears to be a qualified *yes.* dBASE IV runs in the LAN environment; whether one considers the LAN implementation of the product acceptable is a matter of individual, or corporate, choice. Some concern has been expressed that dBASE III Plus and dBASE IV can't co-exist on the same LAN server volume. Ashton-Tate's rationale is that this restriction eliminates the possibility of confusion between the directories of the two products. Their position is that, since dBASE III Plus programs will execute with little or no change under dBASE IV, the need for III Plus is eliminated when you upgrade. However, many users and DP managers feel that during the transition from one software product to another, a period of parallel running when both releases are available is prudent, if not absolutely necessary.

Is Supplementary Software Needed?

This question was aimed at determining whether or not dBASE IV sufficiently addresses the needs of EPA's diverse user community. Most of our study participants felt that dBASE IV can satisfy end users as well as high-end "power users and programmers." Obviously, Ashton-Tate targeted the Control Center at end users, while some of the more sophisticated enhancements in dBASE IV are aimed at the latter group. Our own limited experience with the product supports a finding that end users can quickly gain limited productivity using the Control Center, and comments from several evaluators indicate an appreciation for the greater power and flexibility Version 1.1's enhancements offer.

Certainly there are other excellent DMBSs on the market, some of which may be preferred over dBASE by data base programmers. To be sure, there are end-user products that provide the ability to perform basic data base functions like creating and editing files, building and executing queries, and designing and printing labels and reports. Such products, although less powerful than dBASE, are easier to learn and use. In the final analysis, however, our data suggest that dBASE IV can satisfy the needs of most EPA users for a database management software product. Moreover, we have not identified any compelling evidence to suggest that NDPD should replace dBASE IV as the supported DBMS for the Agency at this time. On the other hand, ongoing assessments of supplementary products and of client/server options will no doubt continue.

Implications

Considering that we've gone on at some length about dBASE IV, what practical conclusions can users and DP managers draw from our data, and what are the implications in terms of software purchase or upgrade decisions? We'd like to conclude by addressing that question, keeping in mind that PC TAP's mission is not to tell users what to do, but to provide you with some real-world data to help you make informed decisions of your own.

It's important to remember that our data come from a handful of people; nine in the regions and labs, and a few in NDPD. Their perspectives and experience levels with DBMS software are divergent. Some like dBASE very much; some dislike it with equal intensity; several were ambivalent. Maybe our group isn't a good representation of the "typical" dBASE user, but there isn't any strong evidence to suggest that it isn't. Nevertheless, we believe their collective input has focused on the aspects of dBASE IV that most users are concerned about, and has shed some light on them for us all.

The point is, those of you with serious data base applications probably need to decide for yourselves whether to upgrade. We hope you'll find this report helpful in that regard. There are some key factors you should keep in mind as you ponder the decision. For example, if you are a developer and you're in the habit of distributing executable modules to your users, you might think about postponing your decision until you get a chance to evaluate dBASE's "true" compiler. If you have dBASE applications that are used by many people, think about the cost of upgrading all your users, in terms of both the purchase price and the harder-to-quantify costs of learning to use dBASE IV, versus the potential benefits of enhancements like the Control Center, windowing, linking, and improved indexing.

Finally, remember why we conducted this evaluation. It was not to determine whether dBASE is the best microcomputer database management product available. It was to investigate whether, in the wake of the problems with Version 1.0, dBASE IV is now a viable product that NDPD should continue to support. In the absence of conclusive evidence to the contrary, our data suggest dBASE IV Version 1.1 performs satisfactorily for the broad spectrum of EPA usage. The prevailing opinion appears to be that, if you're presently using standalone dBASE III Plus, the improvements in dBASE IV Version 1.1 make the upgrade worthwhile. While some sources consider it acceptable in the LAN environment, within NDPD this issue is still under study.

The design, development, marketing, and support of microcomputer DBMSs is a competitive arena. As the various software companies vie for leadership, users are the only sure winners; competition fosters the development of better software and encourages vendors to improve support for their products. We will continue to monitor this situation, and will keep you informed of significant developments.

Study Contributors

PC TAP appreciates the efforts of the following people in testing software and contributing to the content of this report.

Bradford Amador
EPA Washington Information Center
Washington, DC

Ann Chiu
EPA-Ann Arbor Information Center
Motor Vehicles Lab
Ann Arbor, MI

Rick Foltz
IRMB
EPA Region III
Philadelphia, PA

Kent Hargrave
Information Center Section
EPA Region X
Seattle, WA

Monty Hinton
Information Management Branch
EPA Region I
Boston, MA

Becky Mangum
PC TAP ERN Representative
EPA/ECAO
Research Triangle Park, NC

Ray Murchison
EPA Washington Information Center
Washington, DC

Judy Rubin
OPM-ISB
EPA Region II
New York, NY

Russ Ryder
EPA Lab, Gulf Breeze
Sabine Island, FL

Libby Smith
EPA LAN Systems Manager
National Data Processing Division
Research Triangle Park, NC

Open Forum

Open Forum provides an opportunity for users to share with others their own innovations, or the results of their own technology assessments. The PC Technology Assessment Program neither verifies nor endorses the contents of *Open Forum* items, but we are pleased to offer them as a service to users.

The ScanMan™ Hand-Held Scanner

This article was prepared by the staff of the PC Technology Assessment Program. Questions should be directed to PC TAP at FTS 629-0568, (919) 541-0568, or via EMAIL to PCTAP.

When PC TAP evaluated desktop scanners a year ago, we dismissed handheld scanners as inadequate. One of the participants in our scanner study who had some experience with handhelds called them *toys*. Since that time, we've been reading some encouraging reports about these devices, and we decided to take another look at one.

We acquired a Logitech ScanMan Plus recently. We're running it off a PS/2 Model 70, and we're quite impressed with the performance so far. The scanner came with two software products from Logitech. PaintShow Plus is used for scanning and editing graphics. A text scanning package called CatchWord has optical character recognition (OCR) capabilities and routines to convert scanned text into the format of several popular word processors, including WordPerfect.

The three manuals, one for the scanner itself and one for each piece of software, are clear and easy to follow. If you're a first-time user, it's a good idea to study the manuals. We started off with the "I'll just play with it and learn as I go" approach, but weren't too successful. Using the ScanMan isn't difficult, but the device is very sensitive to the controls for contrast, resolution, and dithering. If you don't understand how to set them properly, or if you forget to adjust them, you can waste a lot of time reading the manuals and trying to figure out why you're getting poor results from your scanning. Invariably, we found that when we set the device up properly, our problems quickly disappeared.

If you read our earlier PC TAP report on desktop scanners, you may remember that we found scanning of images (pictures) usually produced better results than scanning of text. That's because scanned text must go through some extra processing steps during which the *pictures* of alphanumeric characters are examined by OCR software and are converted to actual text. This process is called *recognition*, and it's the key to the success of text scanning. It takes a pretty good OCR package to accurately recognize text in the multitude of type faces and sizes people usually want to process. We found that CatchWord performed better on reasonably large typefaces (12 point or larger), and that its accuracy rate generally was better with monospaced fonts (typewriter-like fonts where the width of all the characters in a given typeface is equal).

For example, we printed the same three-paragraph text sample in both 12 point courier, the common default on lots of printers and typewriters, and also in 10 point Helvetica, the font used in *PC TAP Consumer Reports*. CatchWord failed to recognize, or incorrectly recognized, 27 characters in the Helvetica text, for an error rate of 3.6%. The software failed on only five characters in the courier text, a

.06% error rate. While the latter is outstanding, it also would be easier to correct the 27 mistakes in the Helvetica example than to retype the whole passage. Furthermore, during the recognition process, CatchWord identifies characters with which it's having trouble, and gives you the opportunity to type in what the character actually is. From that point on in the text, when that character is encountered again, the software will interpret it as the character you enter. In our Helvetica example, a lot of the problems were with reading lower case *r*'s. Had we "taught" CatchWord that character during the recognition process, it probably would not have flagged subsequent occurrences, and the number of errors would have been reduced accordingly.

As we mentioned earlier, image scanning produces excellent results. In fact, it's very impressive to watch the speed at which an image is reproduced on your computer monitor as you run the scanner across the page; it's almost instantaneous. The picture below was scanned from a magazine advertisement into PaintShow Plus, and saved as a TIFF (.TIF) file. Then we used the WordPerfect GRAPHCNV utility to convert it to a .WPG file which we imported into this document. The result is pretty impressive when you consider that, after experimenting a bit to get the optimal scanner settings, it was done in a couple of minutes using a device that weighs less than a pound and fits conveniently into your hand.

The ScanMan's scanning window is 4.1 inches wide and 14 inches long. The resolution can be adjusted from 100 to 400 dpi in 100-dpi increments. Images can be scanned with up to 32 shades of gray, and there are four settings for dithering (the density of the pixels in the bitmap—reflected in the graininess of the printed image).

Logitech's latest handheld, the ScanMan 256, is compatible with Windows 3.0 and scans in up to 256 shades of gray. It was favorably reviewed in the "First Look" column on page 64 of the January 21, 1991 edition of *InfoWorld*. Of course, there are several other companies offering handheld scanners. It appears that this technology has really come of age. We've seen the ScanMan Plus and the ScanMan 256 advertised as low as $169 and $289, respectively.

How to Submit Items for Open Forum

In keeping with the PC Technology Assessment Program's objective to have the user community actively involved in TAP projects, users are encouraged to submit items for inclusion in future *PC TAP Consumer Reports.* If you have independently investigated the capabilities of a software product or a hardware component, we would like to hear from you. We'd also like you to share with others your solutions to any problems you may have encountered with a particular application or device, and about tricks, shortcuts, or unique applications you have devised. Although we can't promise to publish every contribution, we will evaluate them all in terms of their potential interest to our readers and their conformance to the spirit and intent of PC TAP.

There are no additional rules for *Open Forum* contributions, but here are some guidelines:

1. Contributions must be typed. Our first preference is that they be submitted on a floppy disk in WordPerfect format. If that isn't possible, the next best method is to EMAIL the text to PCTAP, EPA30647. The least preferable method, but still acceptable, is to mail a typewritten article to TAP at the address on the cover of this publication.

2. The length of your contribution will be determined somewhat by its complexity. However, keep in mind that we're primarily interested in the purpose of your study project and how pleased you were with the results, not in the nitty-gritty details of how you did it. We will publish your name, address, and phone number for those who want more details. Two to three pages is probably a reasonable maximum length. On the other hand, a paragraph containing a nugget that may be useful to others would be equally welcome.

3. All material submitted by users is subject to our editing, and you will not be given an opportunity to review the final manuscript before publication. Sorry, you'll just have to trust us. If we have questions or don't understand any part of your text, we'll contact you for clarification.

We hope you enjoy *PC TAP Consumer Reports,* and we look forward to hearing from individuals who have insights or discoveries to share with others. Thanks for your interest and your participation in the PC Technology Assessment Program.